

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : MATSUSHITA ELECTRIC IND CO
LTD

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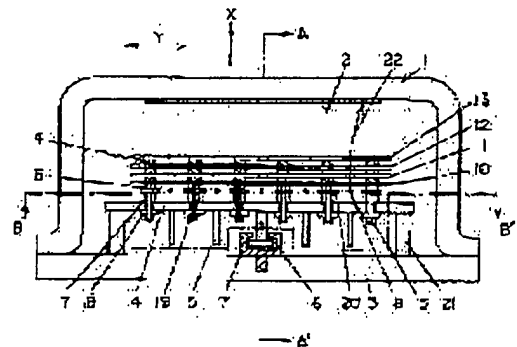
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(54) FLAT DISPLAY

(57)Abstract:

PURPOSE: To provide a flat display of high quality, where shock resistance of an electron beam control electrode in the display is enhanced and sufficient reliability can be kept with respect to a shock during transportation.

CONSTITUTION: A control electrode 10 housed inside a vacuum container constituted of a front container 1 and a back container 2 is integrally fixed to a back electrode 4. A position restricting means comprising a stop pin 6 for inhibiting deformation of the back electrode 4 and a receiving table 7 is interposed between the back electrode 4 and the back container 3. Consequently, the position restricting means restrains deformation of the control electrode 10 due to a shock during transportation within a predetermined range. As a result, it is possible to prevent peeling-off or the like of soldering glass for bonding sheet type electrodes on the control electrode so as to remarkably enhance shock resistance of the control electrode, thus providing a sheet type display of high quality without unevenness of brightness or deficiency of an image.



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(54) 【発明の名称】 平板型表示装置

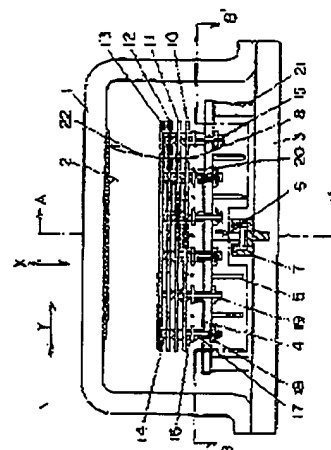
(57) 【異約】

【目的】 平板型表示装置の電子ビーム制御回路の耐衝撃性を向上させ、輸送時等で発生する衝撃に対して十分な信頼性を保ち、高品質の表示装置を提供する。

【構成】 前面容器 1 と背面容器 3 とで構成される真空容器内部に設置した制御電極 1 を、背面電極 4 に一体的に固定し、その背面電極 4 と背面容器 3 との間に背面電極 4 の変形を阻止するストッピン 6 と受け台 7 とで構成される位置規制手段を設けた構成にする。

【効果】 例えば輸送時における衝撃による制御電極10の変形は、位置規制手段によって一定範囲内に留まり、従って、制御電極の個々の平板電極を接合する幸田ガラスの剥離等が防止されて、制御電極の耐衝撃性が大幅に向上し、輝度むらや画角欠陥のない高品質な平板型表示装置を得る事ができる。

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【特許請求の範囲】

【請求項1】 平板状の電子ビーム制御電極と、少なくとも前面容器と背面容器からなる真空容器と、前記前面容器の内面に形成し電子ビームの衝突により発光する蛍光体と、前記制御電極より前記背面容器側に配置し前記制御電極と同程度の大きさでその周辺部を前記真空容器に固定してなる電極保持手段と、前記制御電極を前記保持手段に連結固定する連結固定手段と、前記電極保持手段と前記背面容器との間で前記電極保持手段の略中央部に前記電極保持手段の垂直方向の変位を規制する規制手段とを設けてなる平板型表示装置。

【請求項2】 電極保持手段を背面電極と兼用したことを特徴とする請求項1記載の平板型表示装置。

【請求項3】 平板状の電子ビーム制御電極と、少なくとも前面容器と背面容器からなる真空容器と、前記前面容器の内面に形成し電子ビームの衝突により発光する蛍光体と、前記制御電極より前記背面容器側に配置し前記制御電極と同程度の大きさでその周辺部を前記真空容器に固定してなる電極保持手段と、前記制御電極を前記保持手段に連結固定する連結固定手段と、前記電極保持手段と前記背面容器との間で前記電極保持手段の略中央部に前記電極保持手段の垂直方向の変位を規制する規制手段とを設け、且つ、前記電極保持手段の垂直方向の変位が若干可能な領域としたことを特徴とする平板型表示装置。

【請求項4】 平板状の電子ビーム制御電極と、少なくとも前面容器と背面容器からなる真空容器と、前記前面容器の内面に形成し電子ビームの衝突により発光する蛍光体と、前記制御電極より前記背面容器側に配置し前記制御電極と同程度の大きさでその周辺部を前記真空容器に固定してなる電極保持手段と、前記制御電極を前記保持手段に連結固定する連結固定手段と、前記電極保持手段と前記背面容器との間で前記電極保持手段の略中央部に前記電極保持手段の垂直方向の変位を規制する規制手段とを設け、前記規制手段の一方を前記背面容器に配設し他方を前記電極保持手段に配設し互いに嵌合させて変位規制機能を発揮するよう構成したことを特徴とする平板型表示装置。

【請求項5】 平板状の電子ビーム制御電極と、少なくとも前面容器と背面容器からなる真空容器と、前記前面容器の内面に形成し電子ビームの衝突により発光する蛍光体と、前記制御電極より前記背面容器側に配置し前記制御電極と同程度の大きさでその周辺部を前記真空容器に固定してなる電極保持手段と、前記制御電極を前記保持手段に連結固定する連結固定手段と、前記電極保持手段と前記背面容器との間で前記電極保持手段の略中央部に前記電極保持手段の垂直方向の変位を規制する規制手段とを設け、前記電極保持手段の側面方向の傾斜を向上のためのリブを前記電極保持手段の背面容器側で且つ背面容器に近接させて設け、そのリブを垂直方向の変位規制手段としたこ

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とを特徴とする平板型表示装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は電子ビームを用いた平板型の表示装置に関するものである。

【0002】

【従来の技術】 従来の平板型表示装置を図4を用いて説明する。図4は従来の平板型表示装置の断面図である。50は前面容器で内面には蛍光体51を塗布してある。52は背面容器である。53は背面電極、54は網状のカソードであり、板バネ55により緊張している。

【0003】 56、57、58、59は電子ビーム通過孔を有する荷板の金属板からなる電子ビーム制御電極である。60は半田ガラスからなる接合部材で、制御電極を接合固着している。61は前記制御電極の支持用ボストであり、制御電極の周辺部に設けている。62は背面電極53を背面容器52の固定する固定手段である。

【0004】 カソード54に通電加熱すると電子ビームが放出され、制御電極56、57、58、59を通過して、蛍光体51に衝突して発光するものである。

【0005】

【発明が解決しようとする課題】 上記平板型表示装置を梱包して輸送する場合、輸送時に振動や落下等の衝撃力が装置に作用するが、この衝撃力は重力の加速度の3.5倍から20.0倍程度に達する。

【0006】 特に図4のX-X'方向に衝撃力が作用する場合、電極周辺部に設けたボスト61に固定された電子ビーム制御電極、及び背面電極53はX-X'方向に大きな変形が生じる。

【0007】 このため、電極を固定接合している半田ガラス60に曲げ応力が作用して、半田ガラス60の割断やクラックが発生する。割断をしたガラスのかけらは制御電極の電子ビームの通過孔の付近に飛散して、電子ビームの一部の電荷がこのかけらに蓄積しビームの通過不良に伴う画像欠陥をまねいていた。

【0008】

【課題を解決するための手段】 上記課題を解決する手段として、平板状の電子ビーム制御電極と、少なくとも前面容器と背面容器からなる真空容器と、前記前面容器の内面に形成し電子ビームの衝突により発光する蛍光体と、前記制御電極より前記背面容器側に配置し前記制御電極と同程度の大きさでその周辺部を前記真空容器に固定してなる電極保持手段と、前記制御電極を前記保持手段に連結固定する連結固定手段と、前記電極保持手段と前記背面容器との間で前記電極保持手段の略中央部に前記電極保持手段の垂直方向の変位を規制する規制手段とを設けた平板型表示装置とするものである。

【0009】

【作用】 平板状の制御電極の背後に制御電極の変形を防止する電極保持手段を設け、さらに電極保持手段と背面

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容器との間に電極保持手段の変形を防止する規制手段を設けて背面容器と電極保持手段と制御電極とを連結固定して、衝撃力が作用しても所定量以上の制御電極の変形が発生しないようにする。このため、制御電極を固定している半田ガラスには破壊にいたる曲げ応力が生じなくなる。従って、耐衝撃強度が大幅に向上する。

【0010】

【実施例】以下図面を用いて本発明の実施例を説明する。図1は本発明の平板型表示装置の一実施例の構成を示す断面図である。図2は図1のA-A'断面図、図3は図1のB-B'断面図である。

【0011】1はガラス材料の前面容器、2は蛍光体で前面容器1の内面に塗布してある。3は背面容器で前記前面容器1とを接合し、真空容器を形成している。4は金属板を用いた電極保持手段としての背面電極で、背面容器3側には補強のためのリブ5を複数本配設している。

【0012】6は位置規制手段としてのストップピンで、背面電極4の中央部の複数箇所に植設している。7は位置規制手段としての受け台で、一方は凹形の形状をなし、他方は背面容器3に植設している。

【0013】ストップピン6の他端は凸形に構成し、凸形部と受け台の凹部とはX方向、Y方向に若干の隙間を設けて嵌合させた構成である。受け台7は、ストップピン6に各々対応して配設している。

【0014】8は線状のカソードで、板バネ9により架張され、Y方向に複数本配設している。10は第1制御電極、11は第2制御電極、12は第3制御電極、13は第4制御電極で薄板の金属を用い、電子ビーム通過孔を形成している。

【0015】14は半田ガラス材料からなる電極接合部材で、制御電極を各々接合固定している。15は電極の連結固定手段である固定ピンで、第1制御電極にレーザー溶接等で接合している。固定ピン15の他端は前記背面電極4を貫通している。16、17、18はセラミック等の絶縁材料からなり、所定の厚みを有するスペーサリングで、固定ピン15が貫通している。19は固定リングで固定ピン15の一端と溶接固定してある。

【0016】20は短冊形状の補助電極である。固定ピン15は制御電極の周辺部、及び中央部に複数本配設し、背面電極4に制御電極10を一定の間隔を隔てて固定している。21は電極支持用ポストで背面容器3に植設し、背面電極4の周辺部を支持固定している。

【0017】第1制御電極10にはカソード8より高い電位を印加して、電子ビーム22を引き出す機能をもたせてある。背面電極4はカソード8より低い電位を印加し、電子ビームを反発させる機能を持たせている。補助電極20にはカソード8と第1制御電極10との中間電位を印加している。

【0018】第2制御電極は支調電極、第3制御電極、

第4制御電極は偏向電極である。蛍光体2には高電圧を印加してアノードとしている。

【0019】以上の様な構成で、図示しない電圧印加手段により制御電極、カソードに電圧を印加する。カソードからは熱電子22が放出され、制御電極孔を通過して蛍光体に衝突して発光させる構成である。

【0020】ストップピン6と受け台7との矢印X方向の嵌合隙間Lは、半田ガラス材料の電極接合部材14で接合固定した制御電極が、X方向に捻んでも電極接合部材14が剥離やクラックを生じることのない寸法に設定している。

【0021】以上の構成の平板型表示装置に矢印X方向の衝撃力が作用した場合、制御電極群は固定ピン15により背面電極4に一体固定されているため、背面電極4はX方向に捻む量だけ変形する。

【0022】背面電極4と背面容器3との間には、ストップピン6と受け台7からなる位置規制手段があるため、X方向の変形は嵌合隙間L以上変形することはない。

【0023】従って、従来の構造で問題であったX方向の衝撃時の変形は嵌合隙間L以内で抑えられるため、耐衝撃性は大幅に向上し、信頼性の高い平板型表示装置を提供することが可能となる。

【0024】さらに、リブ5の長さを延長し、背面容器3に近接させることにより、衝撃時のストッパーとすることも可能である。ストップピン6と受け台7との間に嵌合隙間を設けることにより、表示装置の熱封着プロセス時の背面電極4と背面容器3との間に生じる熱膨張差による熱応力が互いに作用することなく安定に製造することが可能となる。

【0025】

【発明の効果】以上のように制御電極を背面電極に一体的に固定し、その背面電極と背面容器との間に背面電極の変形を阻止する位置規制手段を設けた構成にすることにより、制御電極の耐衝撃性は大幅に向上させ、輸送時における衝撃による電極の変形、半田ガラスの剥離等を防ぎ、適度むらや画像欠陥のない高品質な平板型表示装置を提供するものである。

【図面の簡単な説明】

【図1】本発明の平板型表示装置の一実施例の構成を示す断面図

【図2】図1のA-A'断面図

【図3】図1のB-B'断面図

【図4】従来の平板型表示装置の構成を示す断面図

【符号の説明】

- 1 前面容器
- 3 背面容器
- 4 背面電極
- 6 ストップピン
- 7 受け台

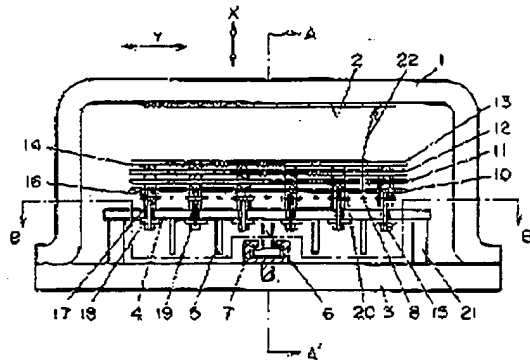
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- 10 第1制御電極
14 電極接合部材

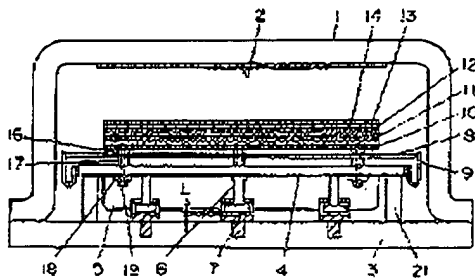
- * 15 固定ピン
* 21 支持ポスト

【図1】

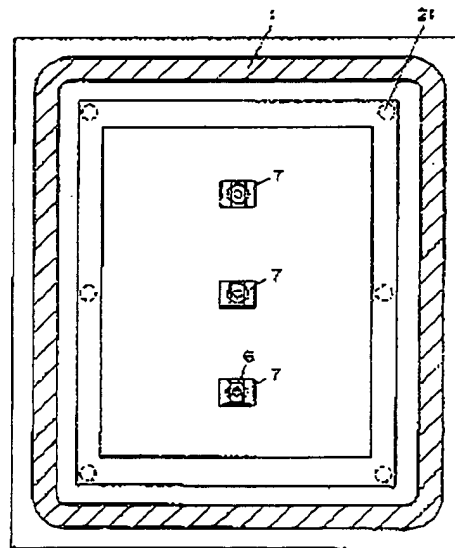


- 1 前面ガラス
2 発光体
3 背面ガラス
4 背面電極
6 ストップピン
7 基板
10 第1制御電極
14 電極接合部材
15 固定ピン
21 支持ポスト

【図2】



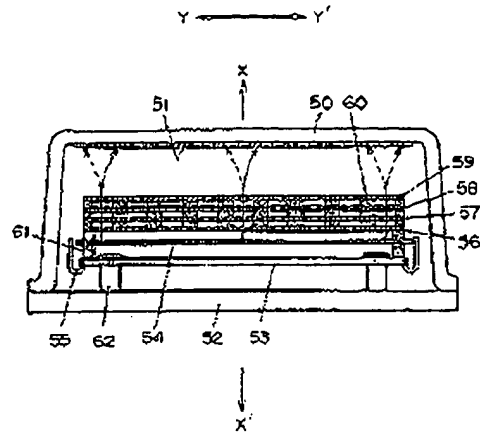
【図3】



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[図4]



Machine translation JP7065754

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(57) **Abstract**

Objects of the InventionThe shock resistance of the electron-beam-control electrode of a monotonous type display is raised, sufficient reliability is maintained to the shock generated in the time of transportation, etc., and a quality display is provided.

Elements of the InventionThe control electrode 10 allocated in an inside of a vacuum housing which comprises the front vessel 1 and the back container 3 is fixed to the back plate 4 in one, and it has composition which established a position regulating means which comprises the stop pin 6 which prevents modification of the back plate 4 between the back plate 4 and back container 3, and the cradle 7.

EffectFor example, modification of the control electrode 10 by the shock at the time of transportation, Exfoliation of the solder glass which stops in a fixed range by a position regulating means, therefore joins each plate electrode of a control electrode etc. can be prevented, the shock resistance of a control electrode can improve substantially, and a quality monotonous type display without luminosity unevenness or an image defect can be obtained.

Claim(s)

Claim 1A monotonous type display comprising:

A plate-like electron-beam-control electrode.

A vacuum housing which consists of a front vessel and a back container at least.

A fluorescent substance which forms in an inner surface of said front vessel, and emits light by the collision of an electron beam.

Electrode holding mechanism which arranges from said control electrode to said back container side, and fixes the periphery to said vacuum housing in a size comparable as said control electrode, A control means which regulates displacement of a perpendicular direction of said electrode holding mechanism in an approximately center part of said electrode holding mechanism between a connecting lock means which carries out the connecting lock of said control electrode to said holding mechanism, and said electrode holding mechanism and said back container.

Claim 2 The monotonous type display according to claim 1 using electrode holding mechanism also back plate .

Claim 3 A vacuum housing which serves as a plate-like electron-beam-control electrode from a front vessel and a back container at least, A fluorescent substance which forms in an inner surface of said front vessel, and emits light by the collision of an electron beam, Electrode holding mechanism which arranges from said control electrode to said back container side, and fixes the periphery to said vacuum housing in a size comparable as said control electrode, A control means which regulates displacement of a perpendicular direction of said electrode holding mechanism is provided in an approximately center part of said electrode holding mechanism between a connecting lock means which carries out the connecting lock of said control electrode to said holding mechanism, and said electrode holding mechanism and said back container, And a monotonous type display, wherein displacement of a perpendicular direction of said electrode holding mechanism has a little possible composition.

Claim 4 A vacuum housing which serves as a plate-like electron-beam-control electrode from a front vessel and a back container at least, A fluorescent substance which forms in an inner surface of said front vessel, and emits light by the collision of an electron beam, Electrode holding mechanism which arranges from said control electrode to said back container side, and fixes the periphery to said vacuum housing in a size comparable as said control electrode, A control means which regulates displacement of a perpendicular direction of said electrode holding mechanism is provided in an approximately center part of said electrode holding mechanism between a connecting lock means which carries out the connecting lock of said control electrode to said holding mechanism, and said electrode holding mechanism and said back container, A monotonous type display constituting so that one side of said control means may be allocated in said back container, another side may be allocated in said electrode holding mechanism, it may be made to fit in mutually and a displacement regulation function may be exhibited..

Claim 5 A vacuum housing which serves as a plate-like electron-beam-control electrode from a front vessel and a back container at least, A fluorescent substance which forms in an inner surface of said front vessel, and emits light by the collision of an electron beam, Electrode holding mechanism which arranges from said control electrode to said back container side, and fixes the periphery to said vacuum housing in a size comparable as said control electrode, A control means which regulates displacement of a perpendicular direction of said electrode holding mechanism is provided in an approximately center part of said electrode holding mechanism between a connecting lock means which carries out the connecting lock of said control electrode to said holding mechanism, and said electrode holding mechanism and said back container, A monotonous type display having been a back container side of said electrode holding mechanism, and having made a rib for rigidity improvement of said electrode holding mechanism approach a back container, having provided it, and making the rib into a vertical displacement control means.

Detailed Description of the Invention

0001

Industrial Application This invention relates to the monotonous type display which used the electron beam.

0002

Description of the Prior Art The conventional monotonous type display is explained using

drawing 4. Drawing 4 is a sectional view of the conventional monotonous type display. 50 has applied the fluorescent substance 51 to the inner surface with the front vessel. 52 is a back container, 53 is a linear cathode and is stretching a back plate and 54 with the flat spring 55.

0003 56, 57, 58, and 59 are electron-beam-control electrodes which consist of a metal plate of the sheet metal which has an electron beam passing hole. 60 is a joining member which consists of solder glass, and is carrying out junction adherence of the control electrode. 61 is the mailbox for support of said control electrode, and is provided in the periphery of the control electrode. 62 is a fixing means to which the back container 52 fixes the back plate 53.

0004 If energizing heating is carried out to the cathode 54, an electron beam will be emitted, the control electrodes 56, 57, 58, and 59 are passed, and light is collided and emitted to the fluorescent substance 51.

0005

Problem(s) to be Solved by the Invention When packing up and conveying the above-mentioned monotonous type display, impulse force, such as vibration and fall, acts on a device at the time of transportation, but this impulse force amounts to about 200 times from 35 times of gravitational acceleration.

0006 When impulse force acts especially in the direction of X-X' of drawing 4, big modification produces the electron-beam-control electrode fixed to the mailbox 61 provided in the electrode periphery, and the back plate 53 in the direction of X-X'.

0007 For this reason, bending stress acts on the solder glass 60 which is carrying out the fixed joint of the electrode, and exfoliation of the solder glass 60 and a crack occur. It dispersed near the pass hole of the electron beam of a control electrode, and the fragment of exfoliative glass was accumulated in this fragment, and some electric charges of the electron beam imitated the image defect accompanied by poor passage of a beam, and were in it.

0008

Means for Solving the Problem A vacuum housing which serves as a plate-like electron-beam-control electrode from a front vessel and a back container at least as a means to solve an aforementioned problem, A fluorescent substance which forms in an inner surface of said front vessel, and emits light by the collision of an electron beam, Electrode holding mechanism which arranges from said control electrode to said back container side, and fixes the periphery to said vacuum housing in a size comparable as said control electrode, It is considered as a monotonous type display which established a control means which regulates displacement of a perpendicular direction of said electrode holding mechanism in an approximately center part of said electrode holding mechanism between a connecting lock means which carries out the connecting lock of said control electrode to said holding mechanism, and said electrode holding mechanism and said back container.

0009

Function Establish the electrode holding mechanism which prevents modification of a control electrode behind a plate-like control electrode, allocate further the control means which prevents modification of electrode holding mechanism between electrode holding mechanism and a back container, and the connecting lock of a back container, electrode holding mechanism, and the control electrode is carried out, Even if impulse force acts, modification of the control electrode more than the specified quantity is kept from occurring. The bending stress which results in destruction stops for this reason, arising on the solder glass which is fixing the control electrode. Therefore, shock-resistant intensity improves substantially.

0010

Example The example of this invention is described using a drawing below. Drawing 1 is a sectional view showing the composition of one example of the monotonous type display of this invention. Drawing 2 is an A-A' sectional view of drawing 1, and drawing 3 is a B-B' sectional view of drawing 1.

0011 1 is applied to the front vessel of a glass material, and 2 is applied to the inner surface of the front vessel 1 with the fluorescent substance. 3 joins said front vessel 1 with a back container, and forms the vacuum housing. 4 is a back plate as electrode holding mechanism which used the metal plate, and is allocating two or more ribs 5 for reinforcement in the back container 3 side.

0012 6 is a stop pin as a position regulating means, and is implanted in two or more places of the center section of the back plate 4. 7 is a cradle as a position regulating means, one side makes

concave shape and another side is implanted in the back container 3.

0013 Constituting the other end of the stop pin 6 in a convex form, a convex part and the crevice of a cradle are the composition of having established the crevice between some in the direction of X, and the direction of Y, and having made them fitting in. The cradle 7 is allocated respectively corresponding to the stop pin 6.

0014 8 is a linear cathode, is stretched with the flat spring 9 and allocated in the direction of Y two or more. The 1st control electrode and 11 use the 2nd control electrode, 12 uses the 3rd control electrode, 13 uses the metal of sheet metal with the 4th control electrode, and 10 forms the electron beam passing hole.

0015 14 is the electrode jointing material which consists of a solder glass material, and is carrying out junction immobilization of the control electrode respectively. 15 is a lock-pin which is a connecting lock means of an electrode, and is joined to the 1st control electrode by laser welding etc. The other end of the lock-pin 15 has penetrated said back plate 4. 16, 17, and 18 consisted of insulating materials, such as ceramics, they are the spacer rings which have predetermined thickness, and the lock-pin 15 has penetrated them. Welding immobilization of 19 has been carried out with the end of the lock-pin 15 with the stop ring.

0016 20 is a rectangular auxiliary electrode. Two or more lock-pins 15 are allocated in the periphery of a control electrode, and a center section, maintain a fixed interval at the back plate 4, and are fixing the control electrode 10 to it. 21 is implanted in the back container 3 in the mailbox for electrode support, and is carrying out support fixing of the periphery of the back plate 4.

0017 Potential higher than the cathode 8 is impressed to the first control electrode 10, and the function which pulls out the electron beam 22 is given. The back plate 4 impresses potential lower than the cathode 8, and is giving the function to which an electron beam is made to ****. The intermediate potential of the cathode 8 and the first control electrode 10 is impressed to the auxiliary electrode 20.

0018 A modulating electrode, the 3rd control electrode, and the 4th control electrode of the 2nd control electrode are deflecting electrodes. High tension is impressed to the fluorescent substance 2, and it is considered as the anode.

0019 With the above composition, voltage is impressed to a control electrode and a cathode by the voltage applying means which is not illustrated. It is the composition of the thermal electron 22 being emitted from a cathode and passing a control electrode hole, colliding and making a fluorescent substance emitting light.

0020 Although the control electrode which carried out junction immobilization is bent by the electrode jointing material 14 of a solder glass material in the direction of X, the electrode jointing material 14 has set the fitting crevice L between the arrow X directions of the stop pin 6 and the cradle 7 as the size which produces neither exfoliation nor a crack.

0021 Since the control electrode group is really being fixed to the back plate 4 with the lock-pin 15 when the impulse force of an arrow X direction acts on the monotonous type display of the above composition, the back plate 4 changes only the quantity which bends in the direction of X.

0022 Since the position regulating means which consists of the stop pin 6 and the cradle 7 is between the back plate 4 and the back container 3, beyond the fitting crevice L does not transform modification of the direction of X.

0023 Therefore, since the modification at the time of the shock of the direction of X which was a problem with the conventional structure is pressed down within the fitting crevice L, shock resistance improves substantially and it becomes possible to provide a reliable monotonous type display.

0024 It is also possible by extending the length of the rib 5 and making the back container 3 approach to consider it as the stopper at the time of a shock. By establishing a fitting crevice between the stop pin 6 and the cradle 7, it becomes possible to manufacture stably, without the heat stress by the thermal expansion difference produced between the back plate 4 at the time of the heat sealing process of a display and the back container 3 acting mutually.

0025

Effect of the Invention By fixing a control electrode to a back plate in one as mentioned above, and having composition which established the position regulating means which prevents modification of a back plate between the back plate and back container, The shock resistance of a control electrode is raised substantially, modification of the electrode by the shock at the time of

transportation, exfoliation of solder glass, etc. are prevented, and a quality monotonous type display without luminosity unevenness or an image defect is provided.

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Brief Description of the Drawings

Drawing 1The sectional view showing the composition of one example of the monotonous type display of this invention

Drawing 2The A-A' sectional view of drawing 1

Drawing 3The B-B' sectional view of drawing 1

Drawing 4The sectional view showing the composition of the conventional monotonous type display

Description of Notations

- 1 Front vessel
 - 3 Back container
 - 4 Back plate
 - 6 Stop pin
 - 7 Cradle
 - 10 The 1st control electrode
 - 14 Electrode jointing material
 - 15 Lock-pin
 - 21 Supporting post
-

Drawing 1

☒ ID=000003**Drawing 2**☒ ID=000004**Drawing 3**☒ ID=000005**Drawing 4**

☒ ID=000006

☒ ID=000002